Energy Efficiency: State and Federal Activities

Iowa Energy Efficiency Study Committee

November 13, 2007

Remarks by Doug Seiter

DOE Golden Project Management Center




At the National Level

Leading by Example

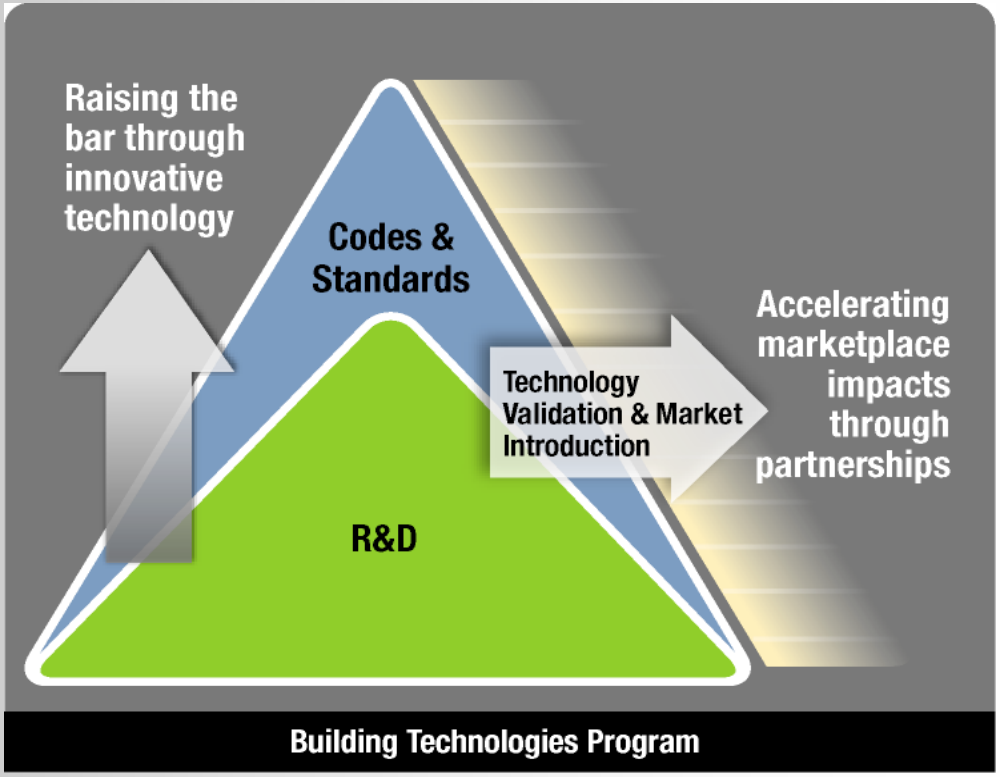
"The federal buildings represent, including state buildings, 10 percent of the total U.S. economy today, 44 percent of LEED applications currently are from government-owned buildings for LEED certification."

Michael Zimmer, Energy Practice Group at Thompson Hine

Building Technologies Program

BTP Mission

Mission: Develop technologies, tools, and standards for making residential and commercial buildings and appliances more energy-efficient, productive, and affordable.

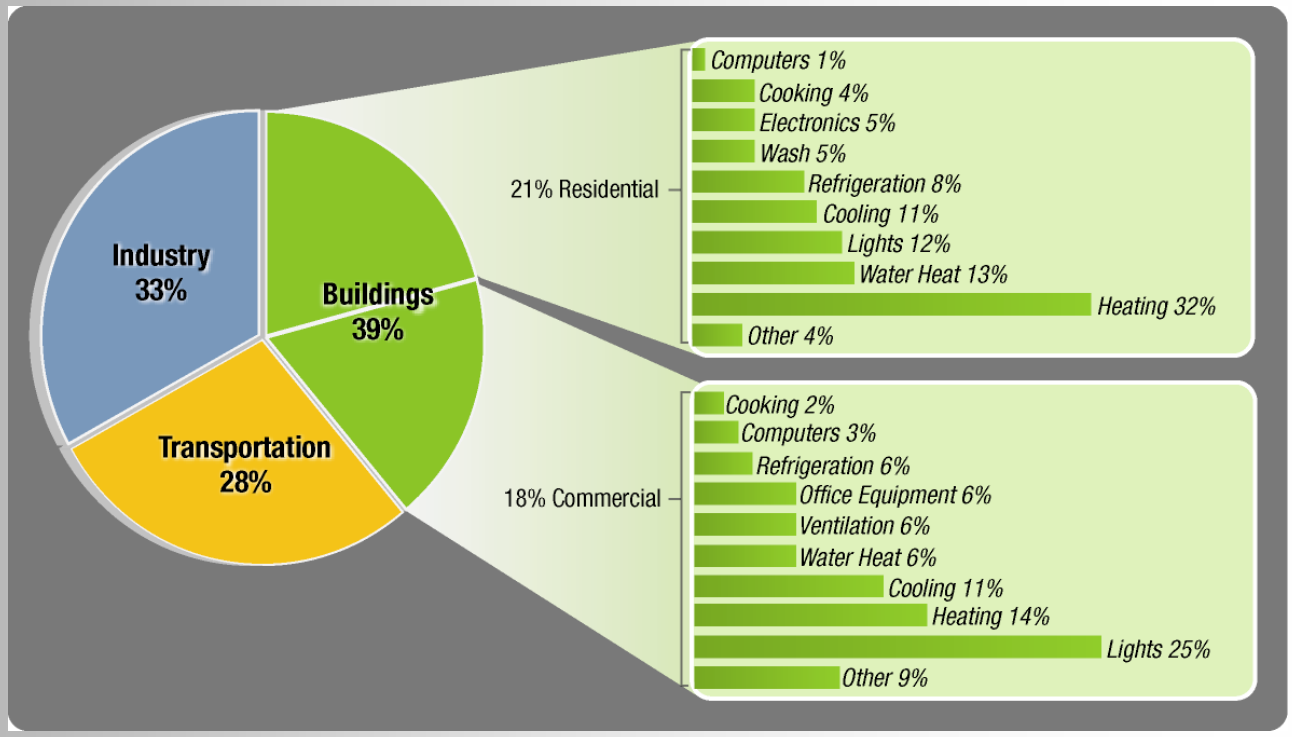


Building Technologies Program

Buildings = ENORMOUS opportunity

Buildings consume 39% of total U.S. energy

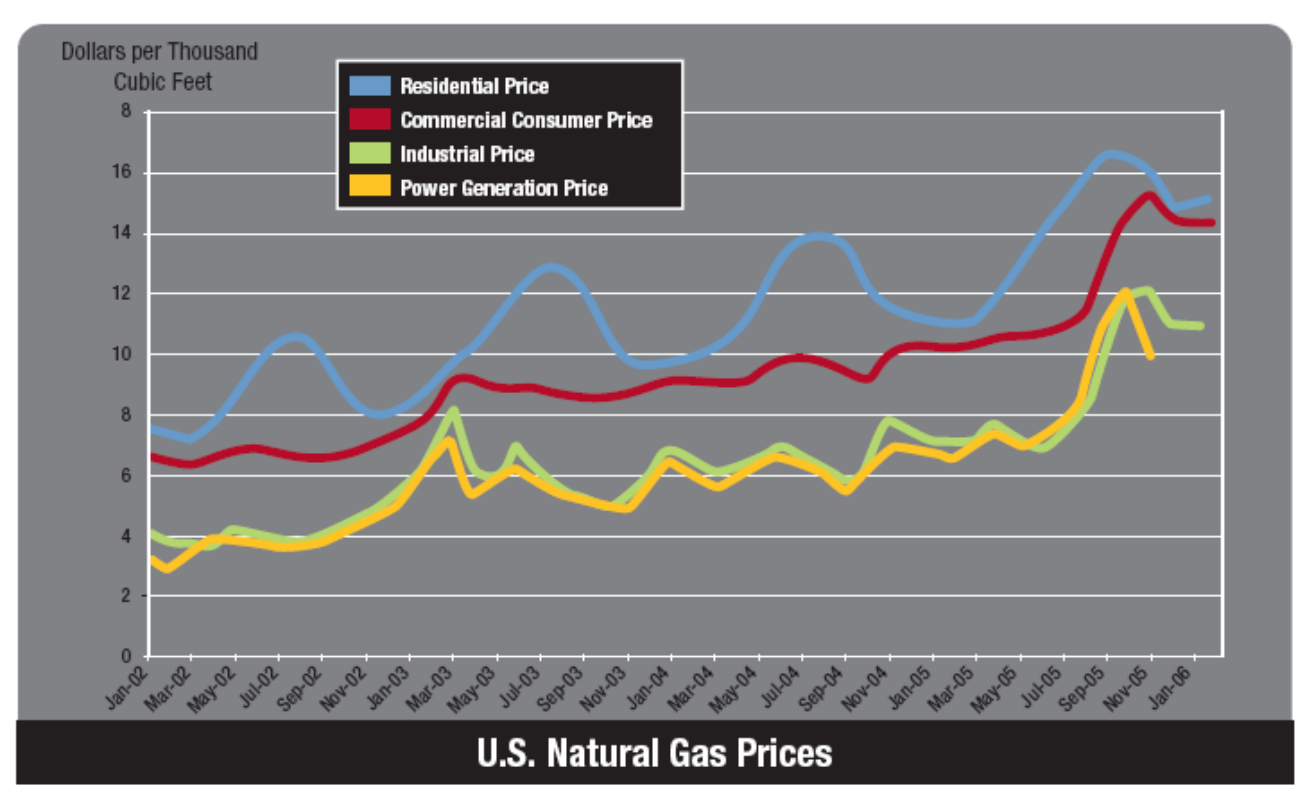
- 71% of electricity
- 53% of natural gas (primary consumption)



Source: 2005 Building Energy Databook with remainder equal to SEDS adjustment.

ROIs will continue growing

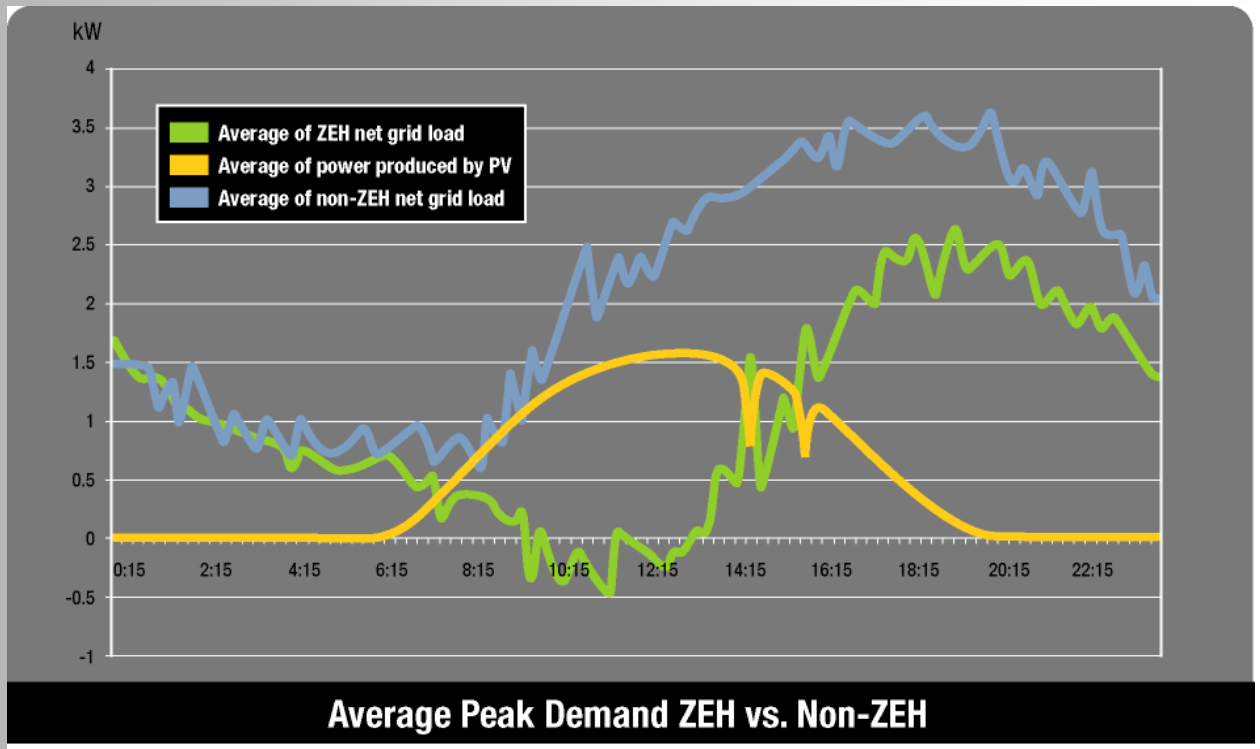
Returns will increase with projected upward pressures on energy prices



Pressures to Reduce Peak Demand

Closing in on "zero-peak-demand" communities

The non-ZEH houses in this Sacramento example are still highly energy efficient (exceeding California Title-24 cooling standards by at least 35%)



Based on July 15, 2005 data from the Sacramento Municipal Utility District
High temperature 107 degrees F, min temperature 71 degrees F

Disaster Recovery and Mitigation

- Combine energy efficiency and disaster resistance during rebuilding
- $900 million to rebuild 310,353 homes to ENERGY STAR standards would pay for itself in just 7.5 years

Energy Policy Act 2005

Deduction for commercial buildings

- Applies to new construction and retrofits that are placed in service after December 31, 2005, and prior to January 1, 2008 (extended to the end of 2008)
- Upgrades to lighting, HVAC, hot water, and building envelope that reduce energy and power consumption by 50% compared to ASHRAE standards, and 60 cents per square foot for subsystems

Distributed heat and power

- Production credit extended: geothermal, biomass, landfill gas
- Tax credit up to 30% for solar power or hot water
- Tax credit for fuel cells or microturbines
- Grid connection and net metering

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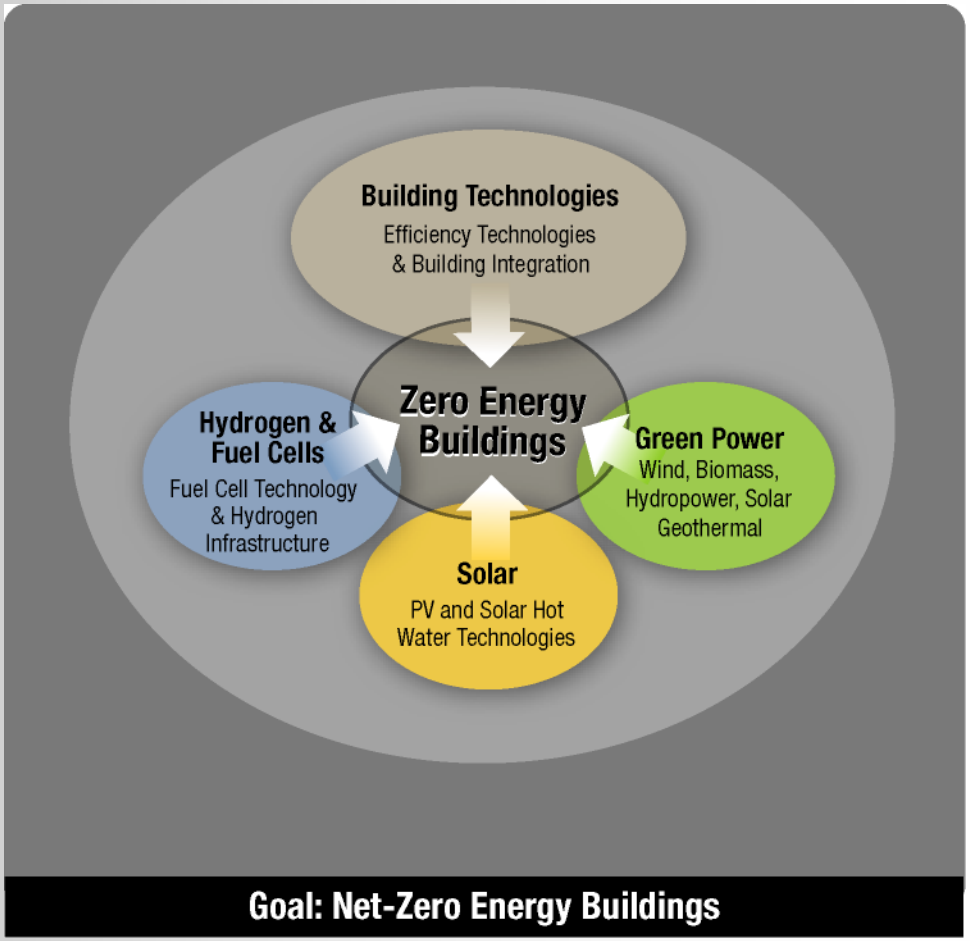
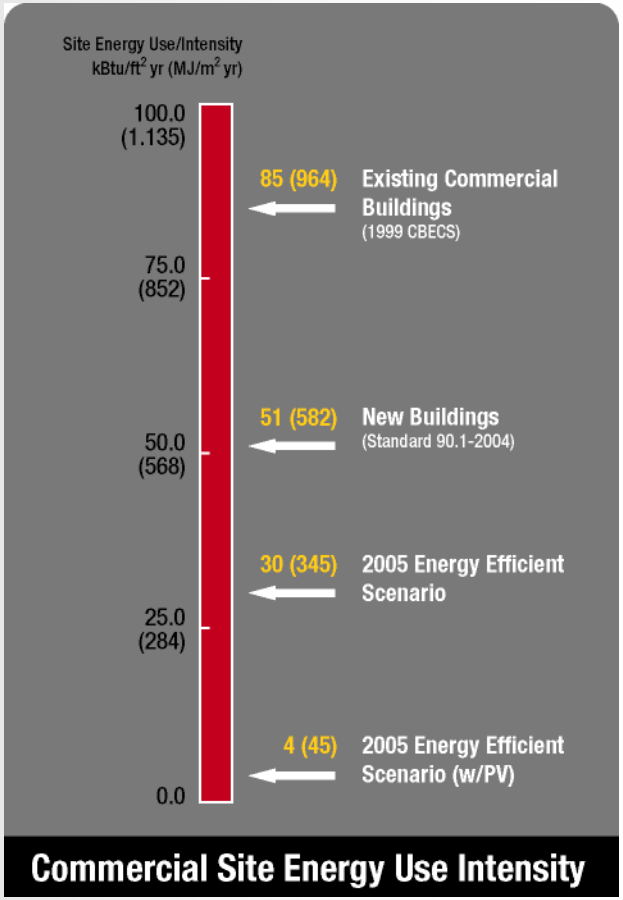
Integrating Efficiency and Renewables



Many Commercial Buildings Can Meet ZEB Goal

- Using today's technology, 27% could be net zero
- With 2025 technology, 67% could be net zero
- Applying 2025 technology and PV to all commercial buildings, sector could generate as much as 36% more energy than it consumes
- Factors in achieving net-zero status: # of floors, plug and process energy use, climate



2005 NREL report:
Are Zero-Energy Commercial Buildings Achievable?

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Commercial Progression




	Code Compliant Building (ASHRAE 90.1-2004)	Better Practice	Low-Energy Building	Ultra Low-Energy Building/ ZEB
Target date	2004	2005	2010	2025
Typical cost/ incremental	0	< 10%	< 20%	< 10%
Consumption	53 kBTU/sqft	40 kBTU/sqft	26 kBTU/sqft	16 kBTU/sqft
Savings from efficiency	N/A	25-30% reduction by energy efficiency	30-50% reduction by energy efficiency	70% reduction by energy efficiency
Percentage from grid	100%	100%	90%	< 50%

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DOE's Approach to Improving Building Energy Efficiency

- Research to develop new more efficient products
- Market transformation
- Mandatory Regulations

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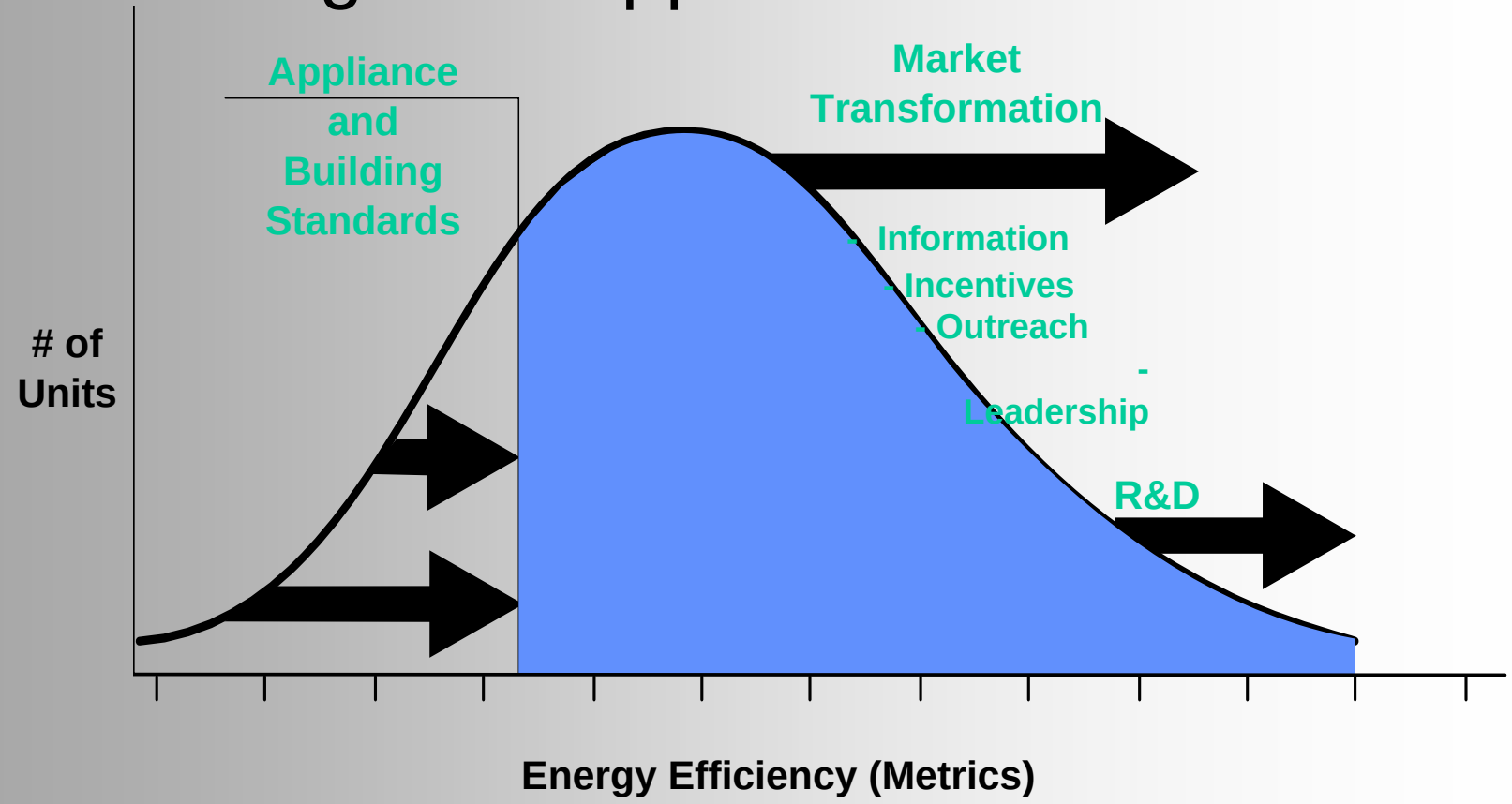
DOE's Integrated Approach



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Research Activities

- Develop new efficient technologies
- Improve the quality & reliability of existing products
- Reduce the cost of efficient products
- Whole building systems engineering

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MARKET TRANFORMATION

- Labeling
  - Energy Guide
  - Energy Star, “Change a Light, Change the World” National Bus Tour
- Accurate rating method
- Incentives
  - Tax credits
- Leadership

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REGULATORY APPROACHES

- Appliance Standards
- Building Codes
  - Residential code – International Energy Conservation Code (IECC)
  - Commercial Code – American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) 90.1

On the Horizon

- Building America Challenge
- USDOE Year of Efficiency
- National Green Building Standards/Programs
  - NAHB National Green Building Program
  - USGBC LEED for Homes
  - Industry programs (i.e. GE Ecomagination)

Activities at the State and Local Level

Examples: States

Iowa

- 2006 Market Penetration of Energy Star Qualified Homes at 57%
- Third most capacity in wind generation (1046 MW)

Examples: States

Colorado

- Over 25 energy-related Bills and Executive Orders were enacted in 2007 (www.colorado.gov/energy)
  - Expanded renewable energy portfolio
  - Statewide energy code
  - Infrastructure
- Colorado Climate Action Plan announced Nov 5, 2007

2.4-kW PV system manufactured by GE, installed at 11,000 foot elevation, on the roof of the Highlands Patrol HQ building at the Aspen Mountain Resort in Aspen, Colorado.

Examples: Cities

Portland, OR

- Portland's first Energy Policy dates back to the late 1970s
- From 1990 to 2003, Portland's per-capita greenhouse gas emissions decreased by 13%
- Total emissions are only slightly above 1990 levels, despite a 16% increase in population
- Gasoline use fell by 8% per capita
- Electricity use for households fell by 10%
- The city requires all new city facilities to meet LEED, the standard of the US Green Building Council

Examples: Cities

Burlington, VT

- Voter-approved bond of $11.3 has resulted in 2 percent less energy use than in 1989
- In 2003, 40% of Burlington Electric's power mix came from renewable energy sources

This biomass gasifier in Burlington, Vermont operates on wood chips.

Photo credit: Warren Gretz and DOE/NREL

Examples: Production Builders

- Foundation insulation: Foundation wall insulation blown fiberglass R-15
- Wall insulation: R-15 blown-in fiberglass batt system with R-5 foam sheathing
- Ceiling insulation: R-38 blown cellulose
- Windows: Double pane, low-e, gas-filled; U-0.34, SHGC 0.28
- HVAC: 92 AFUE gas furnace; mechanical ventilation with air cycler/thermostat combination
- Ducts: 100% in conditioned space; sealed with mastic
- Water heating: 0.82 EF sealed-combustion gas tankless water heater
- Lighting: 5% fluorescent
- Appliances: ENERGY STAR labeled refrigerator, washer, dishwasher, and bath fan
- Blower door test: 3.18 ACH50

Aspen Homes,
Loveland, CO

Green Building Programs…

- Bring sustainability thinking to the mainstream through market forces
- Reduce the “ecological footprint” of buildings
- Accelerate the introduction of “earth-friendly” products and “systems approach” to buildings

Community Energy: A Few Tips

No need to “reinvent the wheel”

- Copy the successes of other cities
- Information and resources abound

Solid commitment with measurable goals and milestones

- Establish a full-time position for coordinating community energy efficiency/renewable energy (EERE) policy and activities
- Provide long-term funding commensurate with the goals

Community Energy: A Few Tips

Develop public-private partnerships to engage the entire community

- Business
- Utilities
- Consumer groups
- Trade organizations

For New Projects, Non-negotiable Process Points

- Integrated design team
  - Well-versed in EE/green building knowledge
- Commitment to high-performance building goals
- Commissioning

Funding Opportunities

For all federal grant postings:
www.grants.gov

Web Resources

- Department of Energy main website: www.eere.energy.gov
- Energy Policy Act of 2005:
  Go to www.thomas.loc.gov and search for H. R. 6
- Regulations posted on Department of Treasury/Internal Revenue Service web sites: www.treasury.gov, www.irs.gov
- Department of Energy, Building Technologies web site: www.eere.energy.gov/buildings
  - Energy Smart Schools
  - Efficient building tax incentives
  - Net Zero Energy Buildings
  - Best Practices Series (Building America)

Other Resources

- For all things green-building: www.buildinggreen.com
- *Environmental Design and Construction*, excellent commercial green building resource
- *How-To Guide to LEED Certification*, available free at www.leedmanagement.com

Contact Information

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